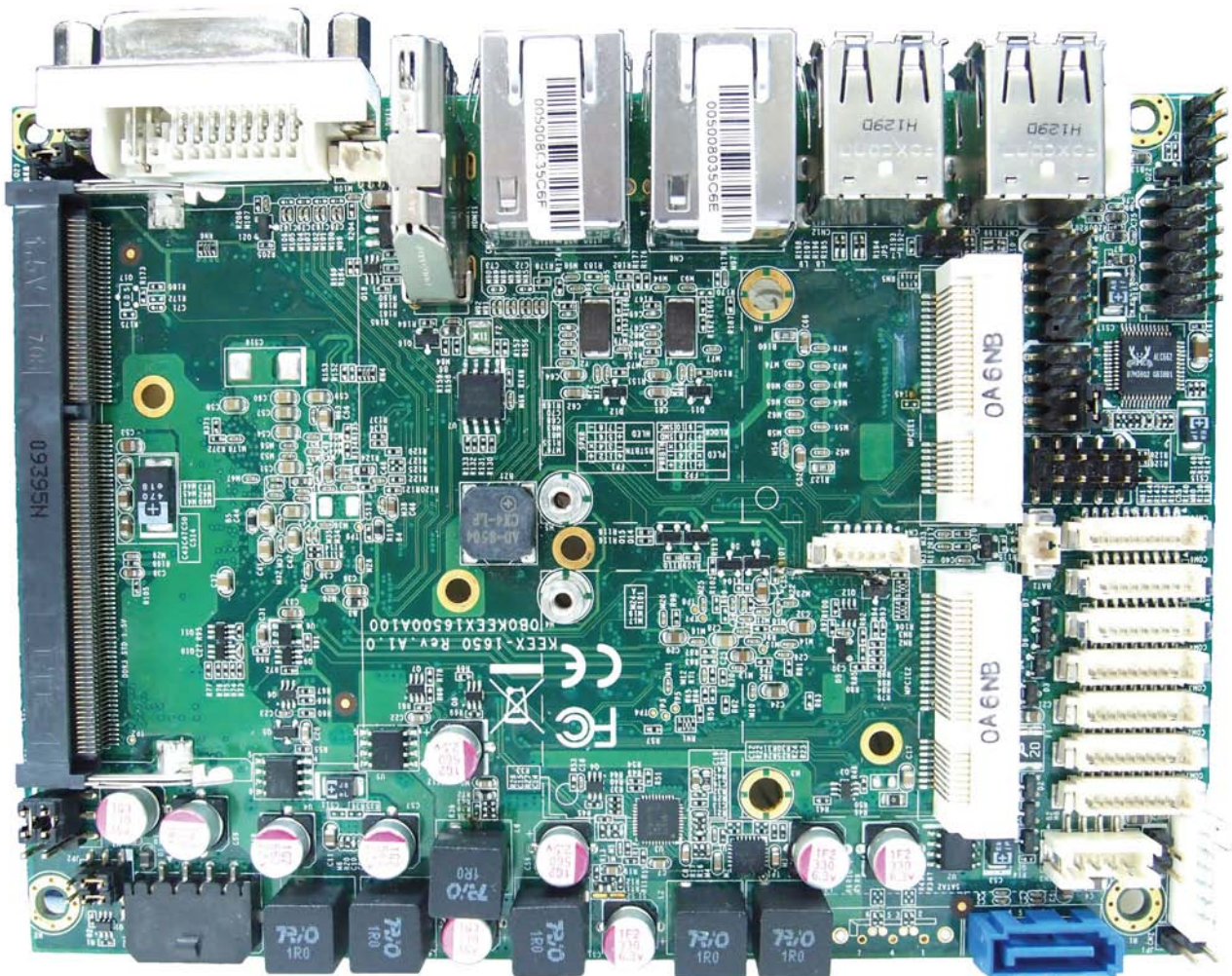


# KEEX-1650 Series

Intel® Embedded Compact Extended Form Factor with  
Dual Core Intel® Atom™ Processor D2550/ N2800

## User's Guide



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*Changes which affect the operation of the unit will be documented in the next revision of this user's guide.*

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# Safety Instructions

## ■ Before You Begin

Before handling the product, read the instructions and safety guidelines on the following pages to prevent damage to the product and to ensure your own personal safety. Refer to the “Advisories” section in the Preface for advisory conventions used in this user’s guide, including the distinction between Warnings, Cautions, Important Notes, and Notes.

- Always use caution when handling/operating a computer. Only qualified, experienced, authorized electronics service personnel should access the interior of a computer. The power supplies produce high voltages and energy hazards, which can cause bodily harm.
- Use extreme caution when installing or removing components. Refer to the installation instructions in this user’s guide for precautions and procedures. If you have any questions, please contact Quanmax Post-Sales Technical Support.

---

### WARNING



High voltages are present inside the chassis when the unit’s power cord is plugged into an electrical outlet. Turn off system power, turn off the power supply, and then disconnect the power cord from its source before removing the chassis cover. Turning off the system power switch does not remove power to components.

---

## ■ When Working Inside a Computer

Before taking covers off a computer, perform the following steps:

1. Turn off the computer and any peripherals.
2. Disconnect the computer and peripherals from their power sources or subsystems to prevent electric shock or system board damage. This does not apply when hot swapping parts.



## Safety Instructions

3. Follow the guidelines provided in “Preventing Electrostatic Discharge” on the following page.
4. Disconnect any telephone or telecommunications lines from the computer.

In addition, take note of these safety guidelines when appropriate:

- To help avoid possible damage to system boards, wait five seconds after turning off the computer before removing a component, removing a system board, or disconnecting a peripheral device from the computer.
- When you disconnect a cable, pull on its connector or on its strain-relief loop, not on the cable itself. Some cables have a connector with locking tabs. If you are disconnecting this type of cable, press in on the locking tabs before disconnecting the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before connecting a cable, make sure both connectors are correctly oriented and aligned.

---

### CAUTION



Do not attempt to service the system yourself except as explained in this user's guide. Follow installation and troubleshooting instructions closely.

---

### ■ Preventing Electrostatic Discharge

Static electricity can harm system boards. Perform service at an ESD workstation and follow proper ESD procedure to reduce the risk of damage to components. Quanmax strongly encourages you to follow proper ESD procedure, which can include wrist straps and smocks, when servicing equipment.

You can also take the following steps to prevent damage from electrostatic discharge (ESD):

- When unpacking a static-sensitive component from its shipping carton, do not remove the component's antistatic packing material until you are ready to install the component in a computer. Just before unwrapping the antistatic packaging, be sure you are at an ESD workstation or grounded. This will discharge any static electricity that may have built up in your body.
- When transporting a sensitive component, first place it in an antistatic container or packaging.
- Handle all sensitive components at an ESD workstation. If possible, use antistatic floor pads and workbench pads.
- Handle components and boards with care. Don't touch the components or contacts on a board. Hold a board by its edges or by its metal mounting bracket.
- Do not handle or store system boards near strong electrostatic, electromagnetic, magnetic, or radioactive fields.

# Preface

## ■ How to Use This Guide

This guide is designed to be used as step-by-step instructions for installation, and as a reference for operation, troubleshooting, and upgrades.

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### NOTE



Driver downloads and additional information are available under Downloads on our web site: [www.quanmax.com](http://www.quanmax.com).

---

## ■ Unpacking

When unpacking, follow these steps:

1. After opening the box, save it and the packing material for possible future shipment.
2. Remove all items from the box. If any items listed on the purchase order are missing, notify Quanmax customer service immediately.
3. Inspect the product for damage. If there is damage, notify Quanmax customer service immediately. Refer to “Warranty Policy” for the return procedure.

## ■ Regulatory Compliance Statements

This section provides the FCC compliance statement for Class A devices.

### FCC Compliance Statement for Class A Devices

The product(s) described in this user's guide has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the user's guide, may cause harmful interference to radio communications. Operation of this equipment in a residential

area (domestic environment) is likely to cause harmful interference, in which case the user will be required to correct the interference (take adequate measures) at their own expense.

Changes or modifications not expressly approved by Quanmax could void the user's authority to operate the equipment.

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### NOTE



The assembler of a personal computer system may be required to test the system and/or make necessary modifications if a system is found to cause harmful interference or to be noncompliant with the appropriate standards for its intended use.

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## ■ Warranty Policy

### Limited Warranty

Quanmax Inc.'s detailed Limited Warranty policy can be found under Support at [www.quanmax.com](http://www.quanmax.com). Please consult your distributor for warranty verification.

The limited warranty is void if the product has been subjected to alteration, neglect, misuse, or abuse; if any repairs have been attempted by anyone other than Quanmax or its authorized agent; or if the failure is caused by accident, acts of God, or other causes beyond the control of Quanmax or the manufacturer. Neglect, misuse, and abuse shall include any installation, operation, or maintenance of the product other than in accordance with the user's guide.

No agent, dealer, distributor, service company, or other party is authorized to change, modify, or extend the terms of this Limited Warranty in any manner whatsoever.

Quanmax reserves the right to make changes or improvements in any product without incurring any obligation to similarly alter products previously purchased.

### Return Procedure

For any Limited Warranty return, please contact Support at [www.quanmax.com](http://www.quanmax.com) and login to obtain a Return Material Authorization (RMA) Number. If you do not have an account, send an email to [support@quanmax.com](mailto:support@quanmax.com) to apply for one.

All product(s) returned to Quanmax for service or credit must be accompanied by a Return Material Authorization (RMA) Number. Freight on all returned items must be prepaid by the customer who is responsible for any loss or damage caused by common carrier in transit. Returns for Warranty must include a Failure Report for each unit, by serial number(s), as well as a copy of the original invoice showing the

date of purchase.

To reduce risk of damage, returns of product must be in a Quanmax shipping container. If the original container has been lost or damaged, new shipping containers may be obtained from Quanmax Customer Service at a nominal cost. Quanmax owns all parts removed from repaired products. Quanmax uses new and reconditioned parts made by various manufacturers in performing warranty repairs and building replacement products. If Quanmax repairs or replaces a product, its warranty term is not extended.

Shipments not in compliance with this Limited Warranty Return Policy will not be accepted by Quanmax.

### **Limitation of Liability**

In no event shall Quanmax be liable for any defect in hardware, software, loss, or inadequacy of data of any kind, or for any direct, indirect, incidental, or consequential damages in connection with or arising out of the performance or use of any product furnished hereunder. Quanmax's liability shall in no event exceed the purchase price of the product purchased hereunder. The foregoing limitation of liability shall be equally applicable to any service provided by Quanmax or its authorized agent.

## **■ Maintaining Your Computer**

### **Environmental Factors**

#### **■ Temperature**

The ambient temperature within an enclosure may be greater than room ambient temperature. Installation in an enclosure should be such that the amount of air flow required for safe operation is not compromised.

Consideration should be given to the maximum rated ambient temperature.

Overheating can cause a variety of problems, including premature aging and failure of chips or mechanical failure of devices.

If the system has been exposed to abnormally cold temperatures, allow a two-hour warm-up period to bring it up to normal operating temperature before turning it on. Failure to do so may cause damage to internal components, particularly the hard disk drive.

#### **■ Humidity**

High-humidity can cause moisture to enter and accumulate in the system. This moisture can cause corrosion of internal components and degrade such

properties as electrical resistance and thermal conductivity. Extreme moisture buildup inside the system can result in electrical shorts, which can cause serious damage to the system.

Buildings in which climate is controlled usually maintain an acceptable level of humidity for system equipment. However, if a system is located in an unusually humid location, a dehumidifier can be used to maintain the humidity within an acceptable range. Refer to the “Specifications” section of this user’s guide for the operating and storage humidity specifications.

### ■ **Altitude**

Operating a system at a high altitude (low pressure) reduces the efficiency of the cooling fans to cool the system. This can cause electrical problems related to arcing and corona effects. This condition can also cause sealed components with internal pressure, such as electrolytic capacitors, to fail or perform at reduced efficiency.

## **Power Protection**

The greatest threats to a system’s supply of power are power loss, power spikes, and power surges caused by electrical storms, which interrupt system operation and/or damage system components. To protect your system, always properly ground power cables and one of the following devices.

### ■ **Surge Protector**

Surge protectors are available in a variety of types and usually provide a level of protection proportional with the cost of the device. Surge protectors prevent voltage spikes from entering a system through the AC power cord. Surge protectors, however, do not offer protection against brownouts, which occur when the voltage drops more than 20 percent below the normal AC line voltage level.

### ■ **Line Conditioner**

Line conditioners go beyond the over voltage protection of surge protectors. Line conditioners keep a system’s AC power source voltage at a fairly constant level and, therefore, can handle brownouts. Because of this added protection, line conditioners cost more than surge protectors. However, line conditioners cannot protect against a complete loss of power.

### ■ **Uninterruptible Power Supply**

Uninterruptible power supply (UPS) systems offer the most complete protection against variations on power because they use battery power to keep the server running when AC power is lost. The battery is charged by the AC power while it is available, so when AC power is lost, the battery can provide power to the system for a limited amount of time, depending on the UPS system.

UPS systems range in price from a few hundred dollars to several thousand dollars, with the more expensive units allowing you to run larger systems for a longer period of time when AC power is lost. UPS systems that provide only 5 minutes of battery power let you conduct an orderly shutdown of the system, but are not intended to provide continued operation. Surge protectors should be used with all UPS systems, and the UPS system should be Underwriters Laboratories (UL) safety approved.

# Chapter 1

## Introduction

### ■ Overview

The KEEEX-1650 is an Intel® embedded compact extended form factor single board computer (SBC) that equips the Intel® Atom Cedarview-M/D processors D2550 / N2800 with the high integration of the Intel® NM10 Express chipset. Featured are DDR3 800/1066 SO-DIMM up to 4GB, 1x single channel LVDS, HDMI, DVI-I, 2x Gigabit Ethernet, 2x SATA, 2x mini PCI Expansion slot, 6x USB 2.0, 6x COM ports, HD audio and Digital I/O.

### Checklist

- Driver/ Manual CD
- Quick Installation Guide
- KEEEX-1650 main board
- 1x SATA Cable\*
- 1x SATA Power Cable\*
- 1x DC Jack Cable\*

### Features

- Intel® Atom™ Processor N2800 (KEEX-1650/1651)
- Intel® Atom™ Processor D2550 (KEEX-1652/1653)
- Intel® NM10 Express Chipset
- Intel® Graphics Media Accelerator 3650
- Single-channel DDR3 800/1066 MHz memory support
- 6xUSB2.0, 6xCOM, 2xGbE LAN, 2xSATA
- 8-bits Digital I/O supported
- LVDS, HDMI, DVI-I Supported
- Mini-PCle



## ■ Product Specifications

Model Name	KEEX-1650 Series
Form Factor	▪ ECX, 146x105mm
Processor	<ul style="list-style-type: none"> <li>▪ KEEX-1650/1651: Intel<sup>®</sup> Atom<sup>™</sup> Processor N2800 (1M Cache, 1.86GHz)</li> <li>▪ KEEX-1652/1653: Intel<sup>®</sup> Atom<sup>™</sup> Processor D2550 (1M Cache, 1.86GHz)</li> </ul>
Memory	▪ 1x DDR3 SO-DIMM socket
Chipset	▪ Intel NM10 Express Chipset
Graphics	<ul style="list-style-type: none"> <li>▪ Intel<sup>®</sup> Graphics Media Accelerator 3650</li> <li>▪ 1x Single channel 18-bit/24-bit LVDS (KEEX-1652/1653)</li> <li>▪ 1x Single channel 18-bit (KEEX-1650/1651)</li> <li>▪ 1x HDMI type A connector on rear I/O</li> <li>▪ 1x DVI-I connector on rear I/O</li> </ul>
Ethernet	<ul style="list-style-type: none"> <li>▪ <b>2x Gb/s Ethernet ports supported</b> <ul style="list-style-type: none"> <li>• 2x Realtek RTL8111E Gigabit Ethernet controllers onboard</li> <li>◆ 2x RJ-45 with Gb/s transformer connectors on rear I/O</li> </ul> </li> <li>• PXE/RPL/WOL supported</li> </ul>
Audio	<ul style="list-style-type: none"> <li>▪ <b>Realtek ALC662-VC HD codec onboard</b> <ul style="list-style-type: none"> <li>• Line-out, Line-in and MIC-in</li> <li>• Jack detection supported</li> </ul> </li> <li>▪ <b>2W audio amplifier onboard</b> <ul style="list-style-type: none"> <li>• 2x Speaker out</li> </ul> </li> <li>▪ <b>1XS/PDIF</b></li> </ul>
Peripheral Support	<ul style="list-style-type: none"> <li>▪ <b>Storage supported</b> <ul style="list-style-type: none"> <li>• KEEX-1650/1652 comes with 1x SATA and 1x mSATA,</li> <li>• KEEX-1651/1653 comes with 2x SATA</li> </ul> </li> <li>▪ <b>6x ports USB2.0 Host supported</b> <ul style="list-style-type: none"> <li>• 4x type A USB2.0 ports supported</li> <li>• 2x USB2.0 ports supported</li> </ul> </li> <li>▪ <b>6x COM ports supported</b> <ul style="list-style-type: none"> <li>• 4x RS-232 supported</li> <li>• 2x TTL level UART supported</li> <li>• RS-232/422/485 selected on COM1</li> </ul> </li> <li>▪ <b>FAN supported</b> <ul style="list-style-type: none"> <li>• 1x 5VDC FAN supported</li> <li>• Smart FAN supported</li> </ul> </li> <li>▪ <b>Digital I/O supported</b> <ul style="list-style-type: none"> <li>• 1x 8-bit digital I/O supported</li> <li>• Input / Output can be programmable</li> </ul> </li> <li>▪ <b>Front panel supported</b> <ul style="list-style-type: none"> <li>• Reset button, HDD LED and External Speaker supported</li> <li>• Power button, Power LED, Keyboard lock and SM bus supported</li> </ul> </li> <li>▪ <b>2x MPCIe usage ( USB2.0 supported )</b></li> <li>▪ <b>One buzzer onboard</b></li> </ul>
Expansion Slot	<ul style="list-style-type: none"> <li>▪ 2x mini PCI Express socket onboard</li> <li>▪ <b>KEEX-1650/1652 comes with 1x Mini-PCIe and 1x mSATA</b></li> <li>▪ <b>KEEX-1651/1653 comes with 2x Mini-PCIe</b></li> </ul>

BIOS	<ul style="list-style-type: none"> <li>AMI uEFI BIOS</li> <li>1x 16Mb SPI flash ROM onboard</li> </ul>
Hardware Monitor	<ul style="list-style-type: none"> <li>Voltages monitoring</li> <li>Temperature monitoring.</li> </ul>
Watchdog	<ul style="list-style-type: none"> <li>Super I/O integrated WDT, max. 65535 seconds/minutes selectable</li> </ul>
Real Time Clock	<ul style="list-style-type: none"> <li>NM10 integrated RTC</li> </ul>
Battery	<ul style="list-style-type: none"> <li>1x CR2032 battery connection</li> <li>Lithium Battery, 3V</li> </ul>
Power	<ul style="list-style-type: none"> <li>12VDC power input</li> <li>AT / ATX power mode supported</li> </ul>
Operation Temp.	<ul style="list-style-type: none"> <li>0°C – 60°C</li> </ul>
Certifications	<ul style="list-style-type: none"> <li>CE, FCC Class A</li> </ul>

Table 1 KEEX-1650 Series Specification

## ■ System Block Diagram

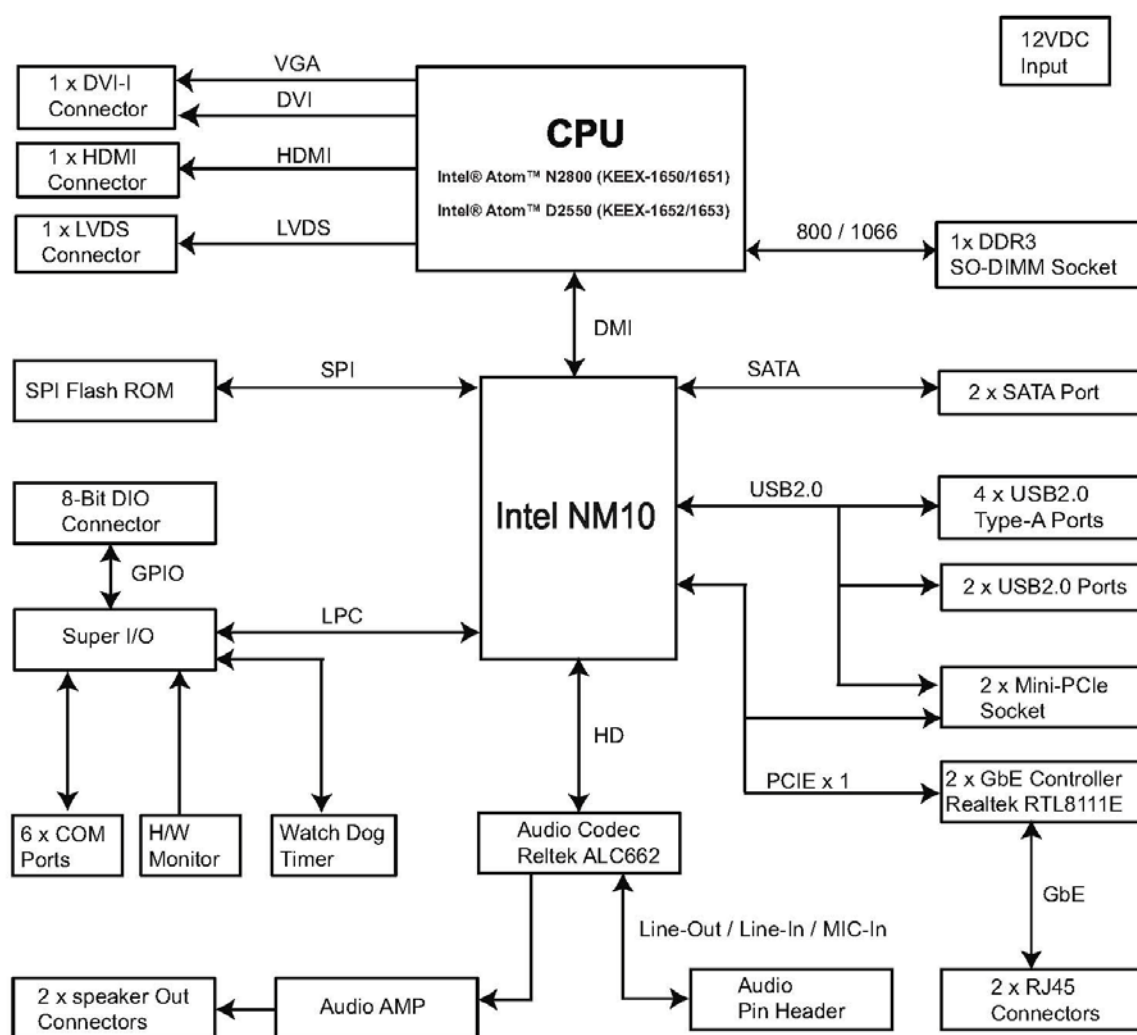
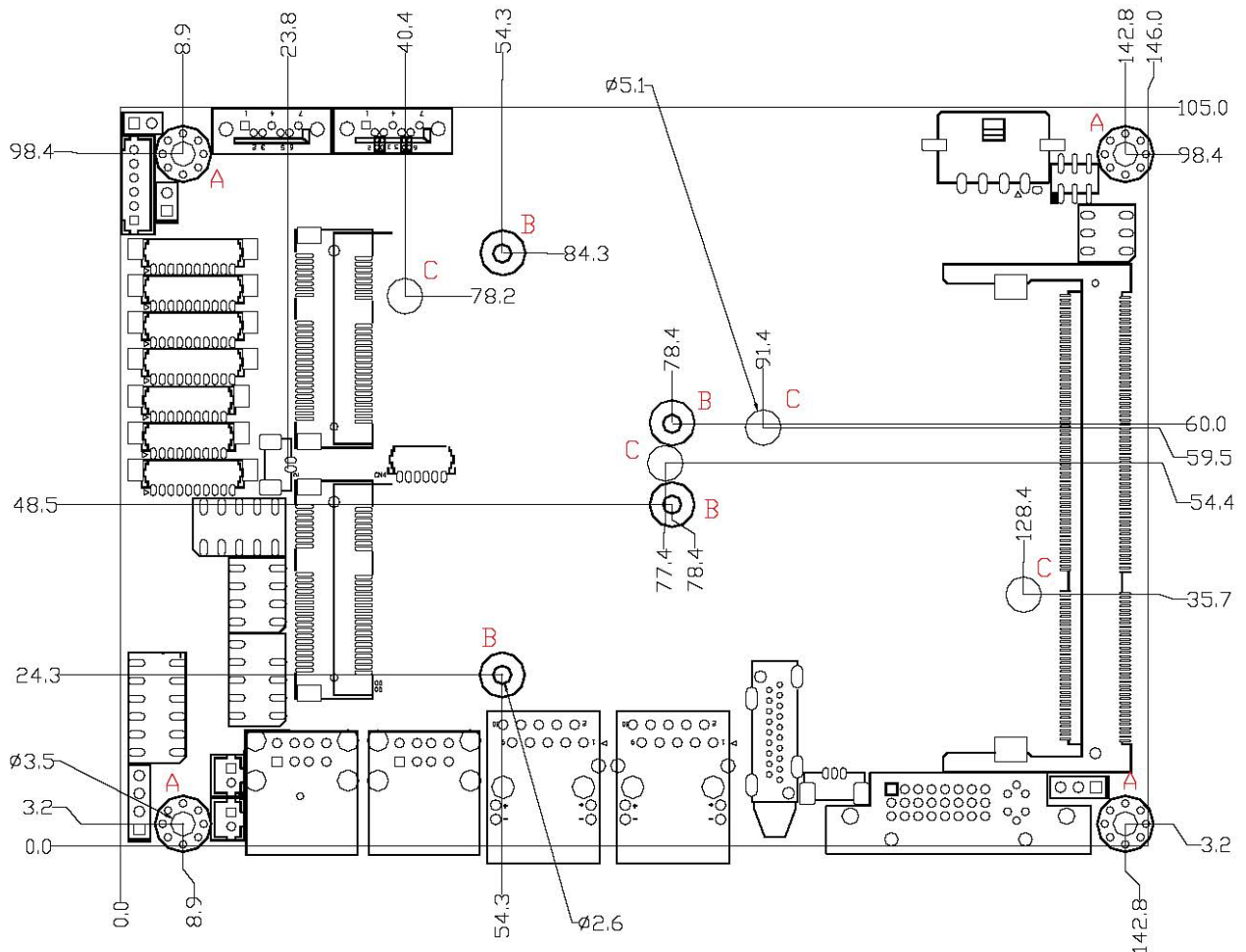
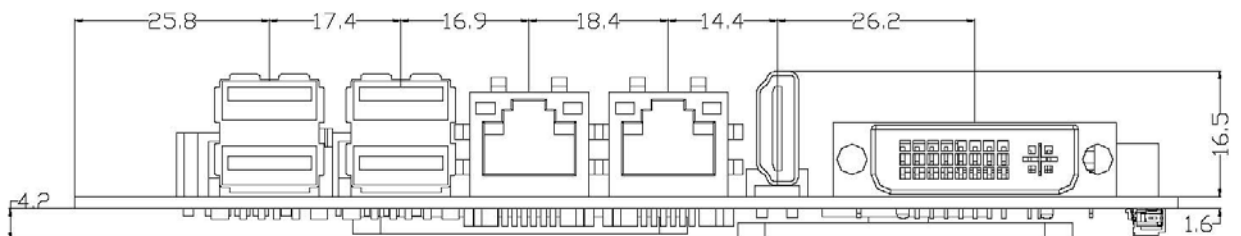


Figure 1 Block Diagram

## ■ Mechanical Dimensions



\*A-Ø: 3.5mm    \*B-Ø: 2.6mm    \*C-Ø: 5.1mm



*Figure 2 Mechanical Dimensions*

## Chapter 2

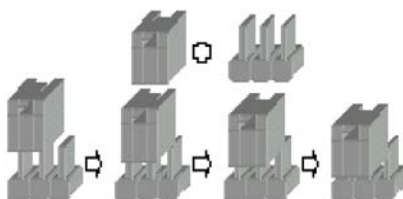
# Hardware Settings

### ■ Overview

This chapter provides the definitions and locations of jumpers, headers, and connectors.

### Jumpers

The product has several jumpers which must be properly configured to ensure correct operation.



*Figure 3 Jumper Connector*

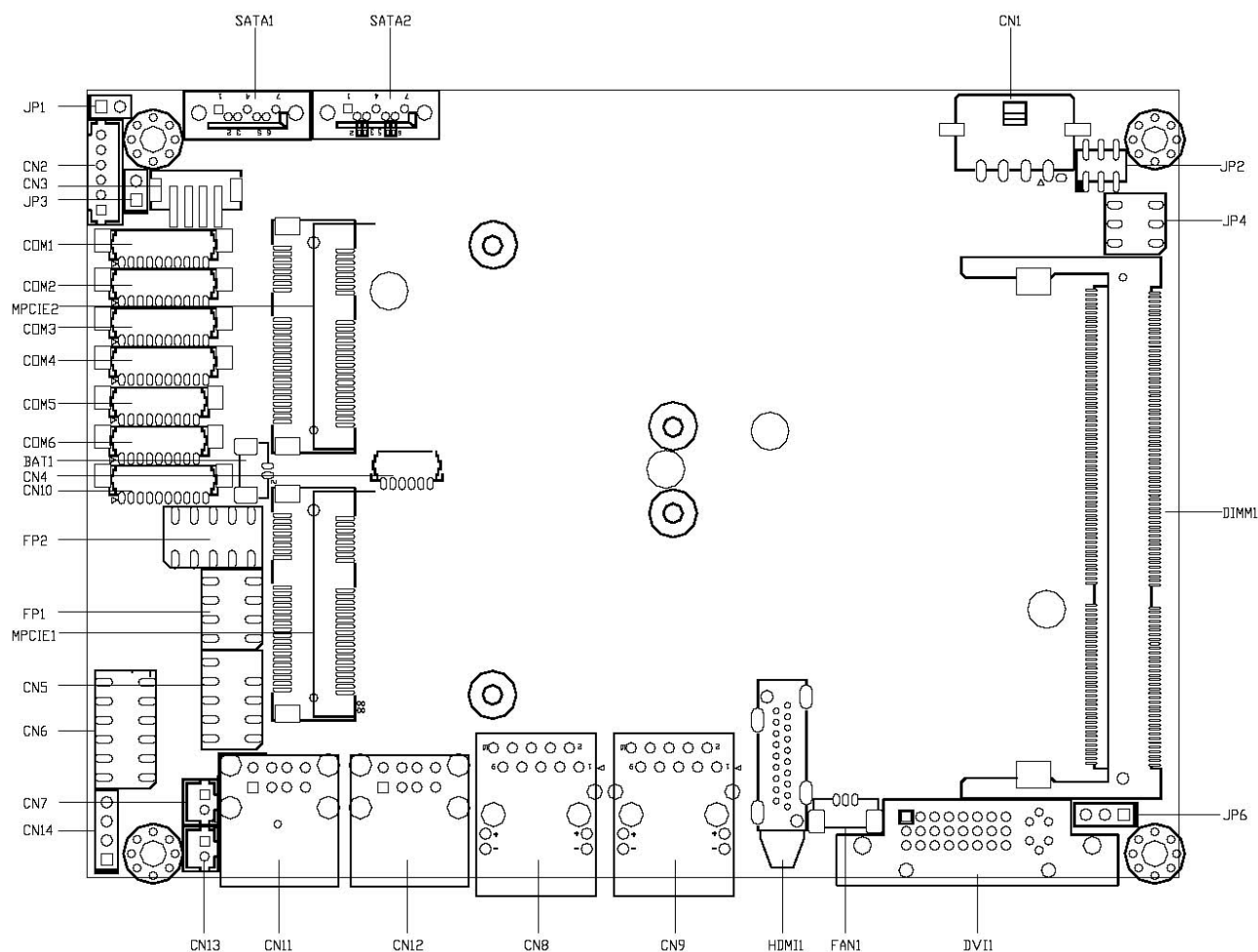
For a three-pin jumper (see *Figure 3*), the jumper setting is designated “1-2” when the jumper connects pins 1 and 2. The jumper setting is designated “2-3” when pins 2 and 3 are connected and so on. You will see that one of the lines surrounding a jumper pin is thick, which indicates pin No.1.

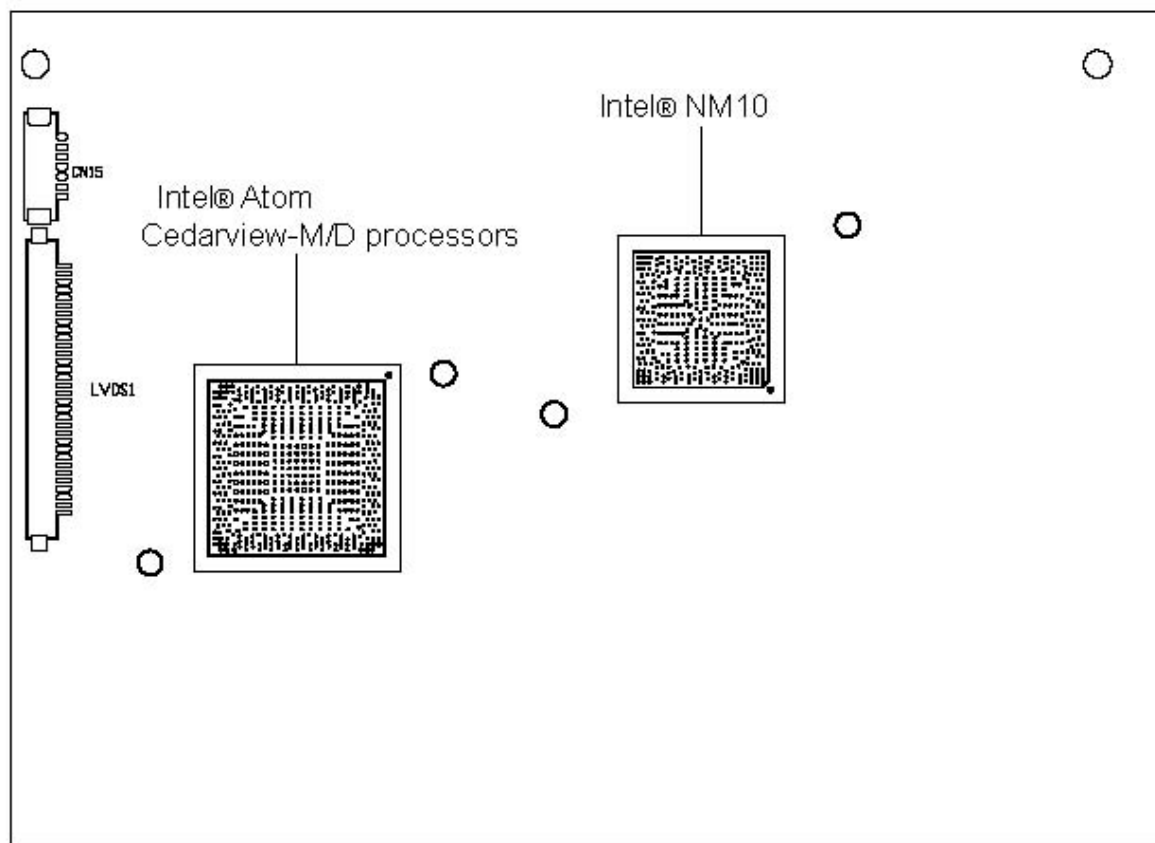
To move a jumper from one position to another, use needle-nose pliers or tweezers to pull the pin cap off the pins and move it to the desired position.

## ■ Jumper Settings and Pin Definitions

For jumper and connector locations, please refer to the diagrams below.

### Top View



**Bottom View**

*Figure 4 Jumper and Connector Locations*

## Jumper Settings

To ensure correct system configuration, the following section describes how to set the jumpers to enable/disable or change functions. For jumper descriptions, please refer to the table below.

Table 2 Jumper List

Label	Function
JP1	RTC Reset Selection
JP2	Backlight Enable Selection for LVDS1
JP3	USB Power Selection
JP4	Panel & Backlight Power Selection for LVDS1
JP5	MPCIE Activity LED Indication
JP6	AT / ATX Power Mode Selection

Table 3 JP1 RTC Reset Selection

Jumper	Status
1-2 Open	Normal Operation
1-2 Short	Clear CMOS
Pitch:2.54mm [YIMTEX3321*02SAGR(6T)]	

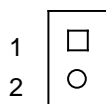


Table 4 JP2 Backlight Enable Selection for LVDS1

Jumper	Setting	Function
1	1-3	Backlight Enable Level = +3.3V
	3-5	Backlight Enable Level = +5V
2	2-4	Backlight Enable High Active
	4-6	Backlight Enable Low Active
Pitch:2.0mm [PINREX 222-97-03GBB1]		

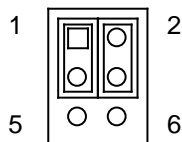


Table 5 JP3 USB Power Selection

Jumper	Status
1-2 Open	USB power will be cut off in S4 & S5 state.
1-2 Short	USB power is always supply.
Pitch:2.54mm [YIMTEX 3321*02SAGR(6T)]	

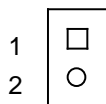


Table 6 JP4 Panel &amp; Backlight Power Selection for LVDS1

Jumper	Setting	Function
1	1-3	Backlight Power = +12V
	3-5	Backlight Power = +5V
2	2-4	Panel Power = +3.3V
	4-6	Panel Power = +5V
Pitch:2.54mm [YIMTEX 3362*03SAGR]		

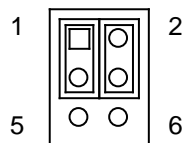
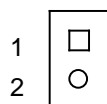
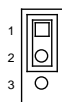


Table 7 JP5 MPCIE Activity LED Indication



Pin	Description
1	LED+
2	LED-
Pitch:2.54mm [YIMTEX 3321*02SAGR(6T)]	

Table 8 JP6 AT / ATX Power Mode Selection



Jumper	Status
1-2 Short	ATX Mode
2-3 Short	AT Mode
Pitch:2.54mm [YIMTEX 3321*02SAGR(6T)]	

## Main Board Pin Assignments

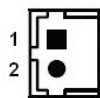
### Internal Connector List

Table 9 Internal Connector List

Label	Function
BAT1	CR2032 Battery Power Input Wafer
BZ1	Onboard Buzzer
COM1	RS-232/422/485 Port 1 Wafer
COM2	RS-232 Port 2 Wafer
COM3	RS-232 Port 3 Wafer
COM4	RS-232 Port 4 Wafer
COM5	TTL Level Serial Port 5 Wafer
COM6	TTL Level Serial Port 6 Wafer
CN1	DC12V Power Input Wafer
CN2	PS/2 Keyboard / Mouse Wafer
CN3	HDD Power Output Wafer
CN4	SIM Interface Wafer for MPCIE1
CN5	USB2.0 Port 4, 5 Pin Header
CN6	Audio Input / Output Pin Header
CN7	Left Channel 2W Audio AMP Output Wafer
CN10	Digital Input / Output Wafer
CN13	Right Channel 2W Audio AMP Output Wafer
CN14	S/PDIF Output Pin Header
CN15	Backlight Power Output Wafer for LVDS1
DIMM1	DDR3 Memory SO-DIMM Socket
FAN1	DC5V FAN Wafer
FP1	Front Panel 1 Pin Header
FP2	Front Panel 2 Pin Header
LVDS1	18/24-bit, Single Channel LVDS Panel Connector
MPCIE1	Mini-PCI Express v1.2 Socket 1
MPCIE2	Mini-PCI Express v1.2 Socket 2 <b>(Only support KEEX-1651 , KEEX-1653)</b>
MPCIE2	mSATA Socket <b>(Only support KEEX-1650 , KEEX-1652)</b>
SATA1	Serial ATA Port 0 Connector
SATA2	Serial ATA Port 1 Connector

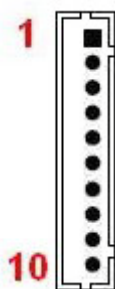


Table 10 BAT1 CR2032 battery Power Input Wafer



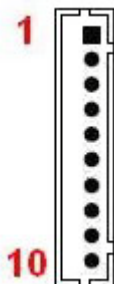
Pin	Signal Name
1	Battery+
2	Battery-
Pitch:1.25mm [Pinrex 712-73-02TWR0]	

Table 11 COM1 RS-232/422/485 Port 1 Wafer



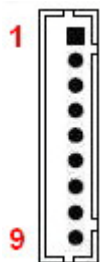
Pin	RS-232	RS-422	Half Duplex RS-485	Full Duplex RS-485
1	DCD	TX-	DATA-	TX-
2	DSR	N/A	N/A	N/A
3	RXD	RX+	N/A	RX+
4	RTS	N/A	N/A	N/A
5	TXD	TX+	DATA+	TX+
6	CTS	N/A	N/A	N/A
7	DTR	RX-	N/A	RX-
8	RI	N/A	N/A	N/A
9	GND	GND	GND	GND
10	+5V	+5V	+5V	+5V
Pitch:1.25mm [Pinrex 712-73-10TWB0]				

Table 12 COM2, 3, 4 RS-232 Port 2, 3, 4 Wafer



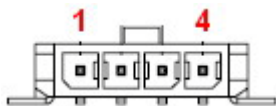
Pin	Signal Name
1	DCD
2	DSR
3	RXD
4	RTS
5	TXD
6	CTS
7	DTR
8	RI
9	GND
10	+5V
Pitch:1.25mm [Pinrex 712-73-10TWB0]	

Table 13 COM5, 6 TTL Level Serial Port 5, 6 Wafer



Pin	Signal Name
1	DCD
2	DSR
3	RXD
4	RTS
5	TXD
6	CTS
7	DTR
8	RI
9	GND
Pitch:1.25mm [Pinrex 712-73-10TWB0]	

Table 14 CN1 DC12V Power Input Wafer



Pin	Signal
1	+12Vin
2	GND
3	GND
4	+12Vin
Pitch: 3.0mm WAFER [Pinrex 733-97-04TBR1]	

Table 15 CN2 PS/2 Keyboard/Mouse Wafer



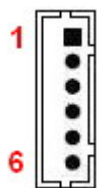
Pin	Signal Name
1	MSCLK
2	VCC
3	MSDAT*
4	KBDAT
5	GND
6	KBCLK
Pitch:2.0mm [YIMTEX 503PW1*06ST-1R]	

Table 16 CN3 HDD Power Output Wafer



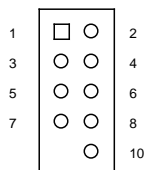
Pin	Signal
1	+12V
2	GND
3	GND
4	+5V
Pitch: 2.0mm WAFER [Pinrex 721-93-04TWR9]	

Table 17 CN4 SIM Interface Wafer for MPCIE1



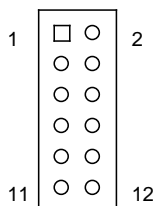
Pin	Signal Name
1	UIM_PWR
2	UIM_DATA
3	UIM_RESET
4	UIM_VPP
5	UIM_CLK
6	GND
Pitch:1.25mm [Pinrex 712-73-06TWB0]	

Table 18 CN5 USB 2.0 Port 4, 5 Pin Header



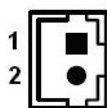
Pin	Signal Name	Pin	Signal Name
1	+USBVCC	2	+USBVCC
3	USB_A-	4	USB_B-
5	USB_A+	6	USB_B+
7	GND	8	GND
9	KEY	10	GND
Pitch:2.54mm [YIMTEX 3362*05SANGR-09]			

Table 19 CN6 Audio Input / Output Pin Header



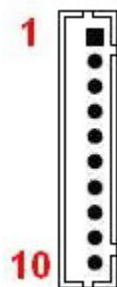
Pin	Signal Name	Pin	Signal Name
1	MIC-In_L	2	MIC-In_R
3	MIC-In_JD#	4	GND
5	Line-In_L	6	Line-In_R
7	Line-In_JD#	8	GND
9	Line-Out_L	10	Line-Out_R
11	Line-Out_JD#	12	GND
Pitch:2.54mm [Pinrex 212-92-06GBE1]			

Table 20 CN7 Left Channel 2W Audio AMP Output Wafer



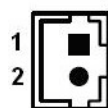
Pin	Signal Name
1	Speaker+
2	Speaker-
Pitch:2.0mm [YIMTEX 503PW1*02STR]	

Table 21 CN10 Digital Input / Output Wafer



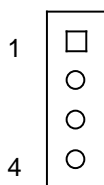
Pin	Signal Name
1	+5V
2	DIO_0
3	DIO_1
4	DIO_2
5	DIO_3
6	DIO_4
7	DIO_5
8	DIO_6
9	DIO_7
10	GND
Pitch:1.25mm [Pinrex 712-73-10TWB0]	

Table 22 CN13 Right Channel 2W Audio AMP Output Wafer



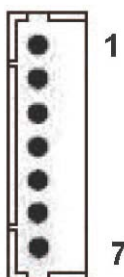
Pin	Signal Name
1	Speaker+
2	Speaker-
Pitch:2.0mm [YIMTEX 503PW1*02STR]	

Table 23 CN14 S/PDIF Output Pin Header



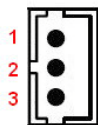
Pin	Signal
1	BIOS_REC#*
2	GND
3	S/PDIF Output
4	GND
Pitch: 3.0mm WAFER [Pinrex 733-97-04TBR1]	
* : Quanmax validation only.	

Table 24 CN15 Backlight Power Output Wafer for LVDS1



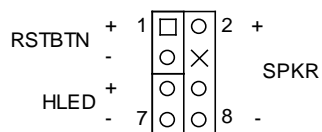
Pin	Signal Name
1	NC
2	BL_ADJ_VOL *
3	GND
4	+5V / +12V **
5	+5V / +12V **
6	GND
7	BL_EN***
Pitch:1.25mm [YIMTEX 501MW1X07MTR-1R]	
* : BL_ADJ can be setting in BIOS setup.	
** : Backlight Power can be selected by JP4.	
*** : BL_EN can be selected by JP2.	

Table 25 FAN1 DC5V FAN Wafer



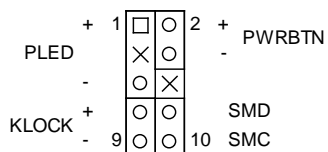
Pin	Signal
1	SENSE
2	+5V
3	GND
Pitch: 1.25mm WAFER [Pinrex 712-73-03TWE0]	

Table 26 FP1 Front Panel 1 Pin Header



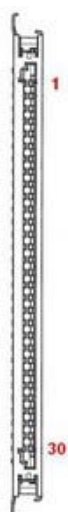
Pin	Signal	Pin	Signal
1	Reset Button +	2	Speaker +
3	Reset Button -	4	NC
5	HDD LED +	6	Internal Speaker-
7	HDD LED -	8	Speaker -
Pitch:2.54mm [YIMTEX 3362*04SANGR]			
Note : Internal Buzzer is enabled when Pin6-8 is shorted.			

Table 27 FP2 Front Panel 2 Pin Header



Pin	Signal	Pin	Signal
1	Power LED +	2	Power Button +
3	NC	4	Power Button -
5	Power LED -	6	NC
7	Keyboard Lock	8	SMBus Data
9	GND	10	SMBus Clock
Pitch:2.54mm [YIMTEX 3362*05SANGR]			

Table 28 LVDS1 18/24-bit, Single Channel LVDS Panel Connector



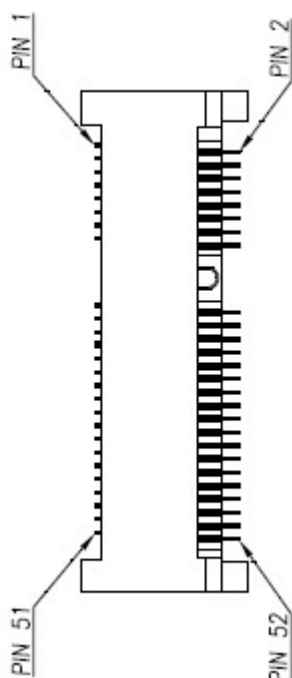
Pin	Signal Name	Pin	Signal Name
1	LVDS_TX0-	16	NC
2	LVDS_TX0+	17	GND
3	LVDS_TX1-	18	NC
4	LVDS_TX1+	19	NC
5	LVDS_TX2-	20	NC
6	LVDS_TX2+	21	NC
7	GND	22	NC
8	LVDS_CLK-	23	NC
9	LVDS_CLK+	24	GND
10	LVDS_TX3-/NC*	25	DDC_DATA
11	LVDS_TX3+/NC*	26	VDDEN
12	NC	27	DDC_CLK
13	NC	28	+3.3V / +5V **
14	GND	29	+3.3V / +5V **
15	NC	30	+3.3V / +5V **

Pitch:1.0mm [JAE FI-X30SSL-HF]

\* : 24-bit LVDS, LVDS\_TX3 for Atom D2550 only

\*\* : Panel Power can be selected by JP4.

Table 29 MPCle1 Mini-PCI Express v1.2 Socket 1

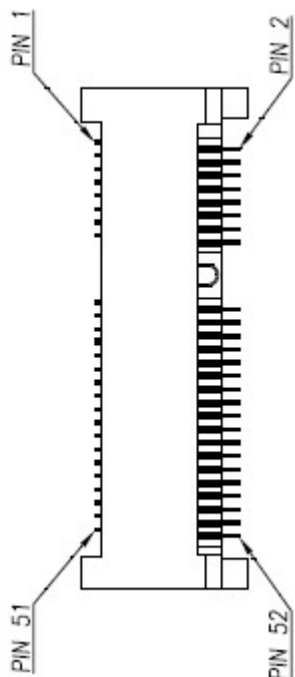


Signal	Pin	Pin	Signal
WAKE#	1	2	+3.3VSB
Reserved	3	4	Ground
Reserved	5	6	+1.5V
CLKREQ#	7	8	UIM_PWR*
Ground	9	10	UIM_DATA*
REFCLK-	11	12	UIM_CLK*
REFCLK+	13	14	UIM_RESET*
Ground	15	16	UIM_VPP*
Reserved	17	18	Ground
Reserved	19	20	W_Disable#
Ground	21	22	PERST#
PERn0	23	24	+3.3VSB
PERp0	25	26	Ground
Ground	27	28	+1.5V
Ground	29	30	SMB_CLK
PETn0	31	32	SMB_DATA
PETp0	33	34	Ground
Ground	35	36	USB_D-
Ground	37	38	USB_D+
+3.3VSB	39	40	Ground
+3.3VSB	41	42	LED_WWAN#
Ground	43	44	LED_WLAN#
Reserved	45	46	LED_WPAN#
Reserved	47	48	+1.5V
Reserved	49	50	Ground
Reserved	51	52	+3.3VSB

Height:9.9mm [FOXCONN AS0B226-S99Q-7H]

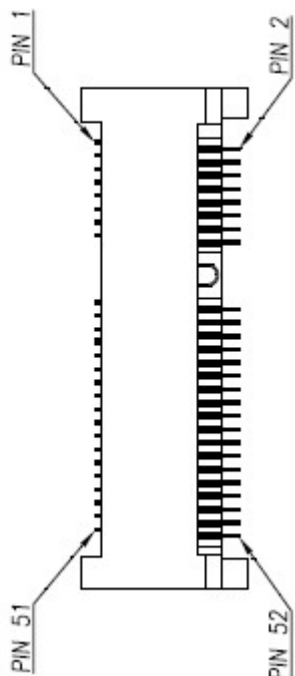
\* : These pins are connected to CN4 directly.

Table 30 MPCIE2 mSATA Socket (KEEX-1650/ 1652 only)



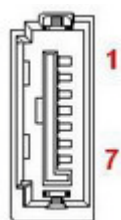
Signal	Pin	Pin	Signal
NC	1	2	+3.3V
NC	3	4	Ground
NC	5	6	NC
N/A	7	8	NC
Ground	9	10	NC
NC	11	12	NC
NC	13	14	NC
Ground	15	16	NC
NC	17	18	Ground
NC	19	20	NC
Ground	21	22	NC
SATA_RX+	23	24	+3.3V
SATA_RX-	25	26	Ground
Ground	27	28	NC
Ground	29	30	NC
SATA_TX-	31	32	NC
SATA_TX+	33	34	Ground
Ground	35	36	NC
Ground	37	38	NC
+3.3V	39	40	Ground
+3.3V	41	42	NC
Ground	43	44	NC
NC	45	46	NC
NC	47	48	NC
NC	49	50	Ground
NC	51	52	+3.3V
Height:9.9mm [FOXCONN AS0B226-S99Q-7H]			

Table 31 MPCIE2 Mini-PCI Express V1.2 Socket 2 (KEEX-1651/1653 only)



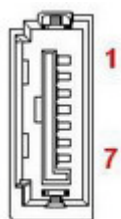
Signal	Pin	Pin	Signal
WAKE#	1	2	+3.3VSB
Reserved	3	4	Ground
Reserved	5	6	+1.5V
CLKREQ#	7	8	Reserved
Ground	9	10	Reserved
REFCLK-	11	12	Reserved
REFCLK+	13	14	Reserved
Ground	15	16	Reserved
Reserved	17	18	Ground
Reserved	19	20	W_Disable#
Ground	21	22	PERST#
PERn0	23	24	+3.3VSB
PERp0	25	26	Ground
Ground	27	28	+1.5V
Ground	29	30	SMB_CLK
PETn0	31	32	SMB_DATA
PETp0	33	34	Ground
Ground	35	36	USB_D-
Ground	37	38	USB_D+
+3.3VSB	39	40	Ground
+3.3VSB	41	42	LED_WWAN#
Ground	43	44	LED_WLAN#
Reserved	45	46	LED_WPAN#
Reserved	47	48	+1.5V
Reserved	49	50	Ground
Reserved	51	52	+3.3VSB
Height:9.9mm [FOXCONN AS0B226-S99Q-7H]			

Table 32 SATA1 Serial ATA Port 0 Connector



Pin	Signal Name
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND
[FOXCONN LD1807V-S52U]	

Table 33 SATA2 Serial ATA Port 1 Connector (KEEX-1651/1653 only)



Pin	Signal Name
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND
[FOXCONN LD1807V-S52U]	



## Rear Panel Pin Assignments

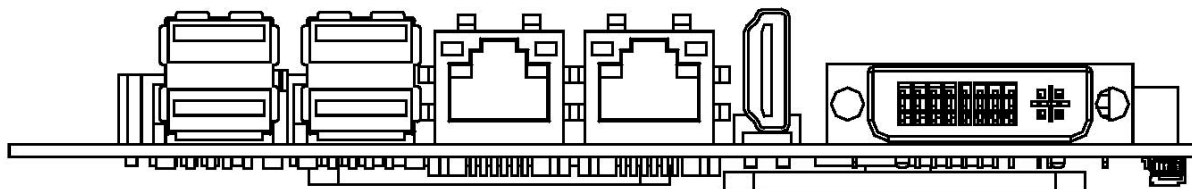
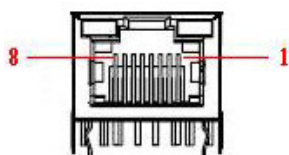


Figure 5 Rear Panel IO

Table 34 Rear Panel Connector List

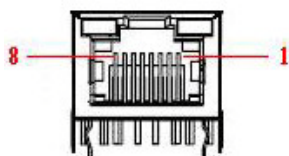
Label	Function
CN8	GbE LAN1 RJ-45 Connector
CN9	GbE LAN2 RJ-45 Connector
CN11	USB2.0 Port 0,1 Type-A Connector
CN12	USB2.0 Port 2,3 Type-A Connector
DVI1	DVI-I Connector
HDMI1	HDMI Connector

Table 35 CN8 GbE LAN1 RJ-45 Connector



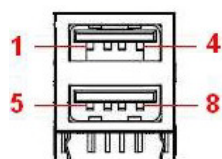
Pin	Signal Name	Pin	Signal Name
1	TX1+	5	TX3-
2	TX1-	6	TX2-
3	TX2+	7	TX4+
4	TX3+	8	TX4-
[UDE RT7-174AAM1A(XA)]			

Table 36 CN9 GbE LAN2 RJ-45 Connector



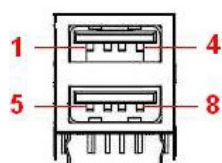
Pin	Signal Name	Pin	Signal Name
1	TX1+	5	TX3-
2	TX1-	6	TX2-
3	TX2+	7	TX4+
4	TX3+	8	TX4-
[UDE RT7-174AAM1A(XA)]			

Table 37 CN11 USB2.0 Port 0, 1 Type-A Connector



Pin	Signal Name	Pin	Signal Name
1	+USBVCC	5	+USBVCC
2	USB_A-	6	USB_B-
3	USB_A+	7	USB_B+
4	GND	8	GND
[FOXCONN UB1112C-8FDE-4F]			

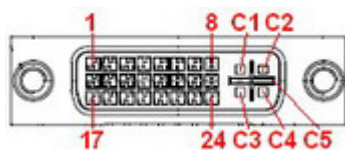
Table 38 CN12 USB2.0 Port 2, 3 Type-A Connector



Pin	Signal Name	Pin	Signal Name
1	+USBVCC	5	+USBVCC
2	USB_A-	6	USB_B-
3	USB_A+	7	USB_B+
4	GND	8	GND

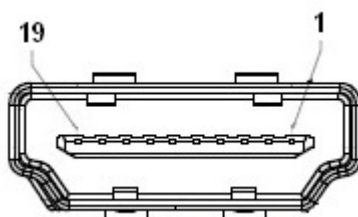
[FOXCONN UB1112C-8FDE-4F]

Table 39 DVI1 DVI-I Connector



Pin	Signal	Pin	Signal	Pin	Signal
1	TX2-	13	NC	C1	R
2	TX2+	14	+5V	C2	G
3	GND	15	GND	C3	B
4	NC	16	HTPLG	C4	HSYNC
5	NC	17	TX0-	C5	GND
6	DDC_CLK	18	TX0+		
7	DDC_DATA	19	GND		
8	VSYNC	20	NC		
9	TX1-	21	NC		
10	TX1+	22	GND		
11	GND	23	TXC+		
12	NC	24	TXC-		

Table 40 HDMI1 HDMI Connector



Pin	Signal
1	TMDS Data2+
2	Ground
3	TMDS Data2-
4	TMDS Data1+
5	Ground
6	TMDS Data1-
7	TMDS Data0+
8	Ground
9	TMDS Data0-
10	TMDS Clock+
11	Ground
12	TMDS Clock-
13	Reserved
14	Reserved
15	DDC_CLK
16	DDC_DATA
17	Ground
18	+5 V Power
19	Hot Plug Detect

[FOXCONN QJ3119C-WFB1-4F]

## Chapter 3

# System Installation

### ■ Expansion Interfaces

- 2x full size mini-PCIe slots supported
- 1x SIM card slot supported (Optional)

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#### NOTE



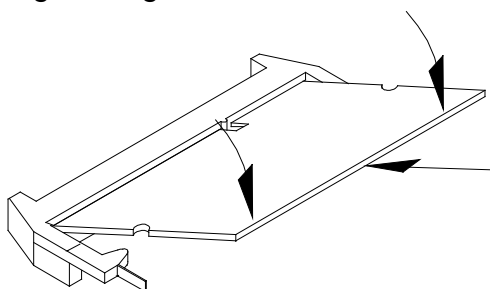
When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to configure any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

---

### ■ Memory Module Installation

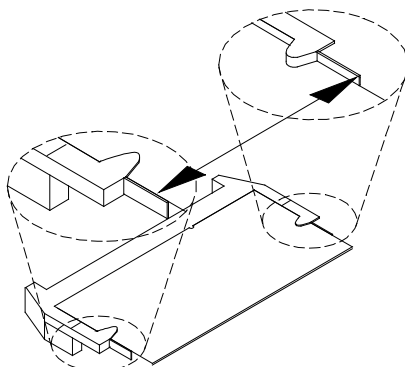
**Carefully follow the steps below in order to install the SO-DIMMs:**

1. To avoid generating static electricity and damaging the SO-DIMM, ground yourself by touching a grounded metal surface or use a ground strap before you touch the SO-DIMM.
2. Do not touch the connectors of the SO-DIMM. Dirt or other residue may cause a malfunction.
3. Hold the SO-DIMM with its notch aligned with the memory socket of the board and insert it at a 30-degree angle into the socket.



*Figure 6 Align the SO-DIMM Memory Module with the onboard socket*

4. Fully insert the module into the socket until a “click” is heard.
5. Press down on the SO-DIMM so that the tabs of the socket lock on both sides of the module



*Figure 7 Press down on the SO-DIMM Memory Module to lock it in place*

### **Removing a SO-DIMM:**

To remove the SO-DIMM, use your fingers or a small screwdriver to carefully push away the tabs that secure either side of the SO-DIMM. Lift it out of the socket. Make sure you store the SO-DIMM in an anti-static bag. The socket must be populated with memory modules of the same size and manufacturer.

### **Removing a DIMM:**

To remove the DIMM, press down both sides of the holders carefully and lift it out of the socket. Make sure you store the DIMM in an anti-static bag. The socket must be populated with memory modules of the same size and manufacturer.

## Chapter 4

# AMI BIOS Setup

### ■ Overview

This chapter provides a description of the AMI BIOS. The BIOS setup menus and available selections may vary from those of your product. For specific information on the BIOS for your product, please contact Quanmax.



**NOTE:** The BIOS menus and selections for your product may vary from those in this chapter. For the BIOS manual specific to your product, please contact Quanmax

---

AMI's ROM BIOS provides a built-in Setup program, which allows the user to modify the basic system configuration and hardware parameters. The modified data will be stored in a battery-backed CMOS, so that data will be retained even when the power is turned off. In general, the information saved in the CMOS RAM will not need to be changed unless there is a configuration change in the system, such as a hard drive replacement or when a device is added.

It is possible for the CMOS battery to fail, which will cause data loss in the CMOS only. If this happens you will need to reconfigure your BIOS settings.

## ■ Main Menu

The BIOS Setup is accessed by pressing the DEL key after the Power-On Self-Test (POST) memory test begins and before the operating system boot begins. Once you enter the BIOS Setup Utility, the Main Menu will appear on the screen. The Main Menu provides System Overview information and allows you to set the System Time and Date. Use the “<” and “>” cursor keys to navigate between menu screens.

Table 41 BIOS Main Menu

BIOS SETUP UTILITY				
Main	Advanced	Boot	Security	Save & Exit
Product Information			→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save & Exit ESC Exit	
Product Name		KEEX-1650		
BIOS Version		0.08		
BIOS Build Date		01/13/2012		
CPU Information				
Intel® Atom™ CPU D2550@1.86GHz				
Microcode Revision		109		
Processor Cores		2		
Memory Information				
Total Size		1024 MB		
Frequency		1067 MHz (DDR3)		
System date		[Thu 12/08/2011]		
System time		[22:44:19]		
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## ■ Advanced Menu

Table 42 Advanced Menu

BIOS SETUP UTILITY		
Main	Advanced	Boot    Security    Server Mgmt    Save & Exit
Onboard LAN1 Controller	[Enabled]	
Onboard LAN1 Boot	[Disabled]	
Onboard LAN2 Controller	[Enabled]	
Onboard LAN2 Boot	[Disabled]	
Audio Controller	[Enabled]	
> Display Configuration		→ ← Select Screen
> Power Management Configuration		↑↓ Select Item
> CPU Advanced Configuration		Enter: Select
> SATA Configuration		+ - Change Opt.
> USB Configuration		F1: General Help
> DIO Configuration		F2: Previous Values
> Super IO Configuration		F3: Optimized Defaults
> H/W Monitor		F4 Save & Exit
		ESC Exit
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### Onboard LAN 1 Controller

Options: Disabled, Enabled

### Onboard LAN 1 Boot

Options: Disabled, Enabled

### Onboard LAN 2 Controller

Options: Disabled, Enabled

### Onboard LAN 2 Boot

Options: Disabled, Enabled

### Audio Controller

Options: Disabled, Enabled

Table 43 Advanced Menu – Display Configuration

BIOS SETUP UTILITY					
Main	Advanced	Boot	Security	Server Mgmt	Save & Exit
Display Configuration Auto Disable IGD [Enabled] Fixed Graphics Memory Size [128 MB] IGFX – Boot Type [VBIOS Default] Active LFP [No LVDS] LVDS Backlight Control-Voltage M [2.5V]					→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save & Exit ESC Exit
Version 2.14.1219. Copyright (C) 2011, American Megatrends, Inc.					

**Fixed Graphics Memory Size**

Options: 128MB, 256MB

**IGFX – Boot Type**

Options: VBIOS Default, CRT, DVI, HDMI

**Active LFP**

Options: No LVDS, Int-LVDS

**Active LFP 【Int-LVDS】**■ **LCD Panel Color**

Options: 18 Bit, 24Bit

■ **LCD Panel Type**

Options: VBIOS Default,

800x600 18Bit 1CH

1024X768 18Bit 1CH

1280X1024 18Bit 1CH

1366X768 18Bit 1CH

**LVDS Backlight Control – Voltage**

Options: 0.0V, 0.5V, 1.0V, 1.5V, 2.0V, 2.5V, 3.0V, 3.5V, 4.0V, 4.5V, 5.0V



Table 44 Advanced Menu –Power Management Configuration

BIOS SETUP UTILITY		
Main	<b>Advanced</b>	Boot    Security    Server Mgmt    Save & Exit
Power Management Configuration		
ACPI Sleep State	[S3 (Suspend to RAM)]	
Restore AC Power Loss	[Power Off]	
Resume By PCIE Device	[Disabled]	
Resume By RTC Alarm	[Disabled]	
>Watchdog Timer Configuration		
		→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save & Exit ESC Exit
Version 2.14.1219. Copyright (C) 2011, American Megatrends, Inc.		

**ACPI Sleep State**

Options: Suspend Disabled, S1 (CPU Stop Clock), S3 (Suspend to RAM)

**Restore AC Power Loss**

Options: Power Off, Power On, Last State

**Resume By PCIE Device**

Options: Disabled, Enabled

**Resume By RTC Alarm**

Options: Disabled, Enabled

**Watchdog Timer Configuration**

■ **WDT Function**

Options: Disabled, Enabled

Table 45 Advanced Menu –CPU Advanced Configuration

BIOS SETUP UTILITY				
Main	Advanced	Boot	Security	Save & Exit
CPU Advanced Configuration			<div>→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save &amp; Exit ESC Exit</div>	
Hyper-Treading		[Enabled]		
Execute Disable Bit		[Enabled]		
Limit CPUID Maximum		[Disabled]		
EIST		[Enabled]		
Version 2.14.1219. Copyright (C) 2011, American Megatrends, Inc.				

**Hyper-Treading**

Options: Disabled, Enabled

**Execute Disable Bit**

Options: Disabled, Enabled

**Limit CPUID Maximum**

Options: Disabled, Enabled

**EIST**

Options: Disabled, Enabled

Table 46 Advanced Menu –SATA Configuration

BIOS SETUP UTILITY				
Main	Advanced	Boot	Security	Save & Exit
Configure SATA as		[ AHCI ]		<div>→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save &amp; Exit ESC Exit</div>
SATA Port 1	TOSHIBA MK8046 (80.0G)			
SATA Port 2	Not Present			
Version 2.14.1219. Copyright (C) 2011, American Megatrends, Inc.				

**Configure SATA as**

Options: IDE, AHCI

Table 47 Advanced Menu –USB Configuration

BIOS SETUP UTILITY				
Main	Advanced	Boot	Security	Save & Exit
USB Configuration			.  → ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save & Exit ESC Exit	
USB Devices:				
1 Drive, 1 Keyboard, 1 Mouse				
Legacy USB Support		[Enabled]		
EHCI Hand-off		[Disabled]		
Mass Storage Devices:				
San Disk		[Auto]		
Version 2.14.1219. Copyright (C) 2011, American Megatrends, Inc.				

**Legacy USB Support**

Options: Disabled, Enabled, Auto

**EHCI hand-off**

Options: Disabled, Enabled

**San Disk**

Options: Auto, Floppy, Forced FDD, Hard Disk, CD-ROM

Table 48 Advanced Menu –DIO Configuration

BIOS SETUP UTILITY				
Main	Advanced	Boot	Security	Save & Exit
DIO Configuration				
DIO-0		[Output Low]		
DIO-1		[Output Low]		
DIO-2		[Output Low]		
DIO-3		[Output Low]		
DIO-4		[Output Low]		
DIO-5		[Output Low]		
DIO-6		[Output Low]		
DIO-7		[Output Low]		
DIO-0 Value		0		
DIO-1 Value		0		
DIO-2 Value		0		
DIO-3 Value		0		
DIO-4 Value		0		
DIO-5 Value		0		
DIO-6 Value		0		
DIO-7 Value		0		
				→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save & Exit ESC Exit
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**DIO-0**

Options: Output Low, Output High, Input

**DIO-1**

Options: Output Low, Output High, Input

**DIO-2**

Options: Output Low, Output High, Input

**DIO-3**

Options: Output Low, Output High, Input

**DIO-4**

Options: Output Low, Output High, Input

**DIO-5**

Options: Output Low, Output High, Input

**DIO-6**

Options: Output Low, Output High, Input

**DIO-7**

Options: Output Low, Output High, Input

Table 49 Advanced Menu – Super IO Configuration

BIOS SETUP UTILITY				
Main	Advanced	Boot	Security	Save & Exit
Super IO Configuration  >Serial Port 1 Configuration >Serial Port 2 Configuration >Serial Port 3 Configuration >Serial Port 4 Configuration >Serial Port 5 Configuration >Serial Port 6 Configuration			→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save & Exit ESC Exit	
Version 2.14.1219. Copyright (C) 2011, American Megatrends, Inc.				

Table 50 Advanced Menu – Super IO Configuration – Serial Port 1 Configuration

BIOS SETUP UTILITY						
Main	Advanced	Boot	Chipset	Power	Security	Exit
Serial Port 1 Configuration				<div>→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save and Exit ESC: Exit</div>		
Serial Port Device Settings		[Enabled] IO=3F8h ; IRQ=4;				
Change Settings		[Auto]				
Serial Port 1 Type		[RS232]				
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.						

**Serial Port**

Options: Disabled, Enabled

**Change Settings**

Options: Auto,

IO=3F8h; IRQ=4;

IO=3F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

**Serial Port Type**

Options: RS232, RS422, RS485

Table 51 Advanced Menu – Super IO Configuration – Serial Port 2 Configuration

BIOS SETUP UTILITY				
Main	Advanced	Boot	Security	Save & Exit
Serial Port 2 Configuration			→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save & Exit ESC Exit	
Serial Port Device Settings		[Enabled] IO=2F8h; IRQ=3;		
Change Settings		[Auto]		
Version 2.14.1219. Copyright (C) 2011, American Megatrends, Inc.				

**Serial Port**

Options: Disabled, Enabled

**Change Settings**

Options: Auto,

IO=2F8h; IRQ=3;

IO=3F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12

Table 52 Advanced Menu – Super IO Configuration – Serial Port 3 Configuration

BIOS SETUP UTILITY				
Main	Advanced	Boot	Security	Save & Exit
Serial Port 3 Configuration			→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save & Exit ESC Exit	
Serial Port Device Settings		[Enabled] IO=3E8h; IRQ=7;		
Change Settings		[Auto]		
Version 2.14.1219. Copyright (C) 2011, American Megatrends, Inc.				

**Serial Port**

Options: Disabled, Enabled

**Change Settings**

Options: Auto,

IO=3E8h; IRQ=7;

IO=3F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12

IO=2F0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12

IO=2E0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12

Table 53 Advanced Menu – Super IO Configuration – Serial Port 4 Configuration

BIOS SETUP UTILITY				
Main	Advanced	Boot	Security	Save & Exit
Serial Port 4 Configuration			→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save & Exit ESC Exit	
Serial Port Device Settings		[Enabled] IO=2E8h; IRQ=7;		
Change Settings		[Auto]		
Version 2.14.1219. Copyright (C) 2011, American Megatrends, Inc.				

**Serial Port**

Options: Disabled, Enabled

**Change Settings**

Options: Auto,

IO=2E8h; IRQ=7;

IO=3F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12

IO=2F0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12

IO=2E0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12



Table 54 Advanced Menu – Super IO Configuration – Serial Port 5 Configuration

BIOS SETUP UTILITY				
Main	Advanced	Boot	Security	Save & Exit
Serial Port 5 Configuration			<div>→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save &amp; Exit ESC Exit</div>	
Serial Port Device Settings		[Enabled] IO=2F0h; IRQ=10;		
Change Settings		[Auto]		
Version 2.14.1219. Copyright (C) 2011, American Megatrends, Inc.				

**Serial Port**

Options: Disabled, Enabled

**Change Settings**

Options: Auto,

IO=2E0h; IRQ=7;

IO=3F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12

IO=2F0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12

IO=2E0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12

Table 55 Advanced Menu – Super IO Configuration – Serial Port 6 Configuration

BIOS SETUP UTILITY				
Main	Advanced	Boot	Security	Save & Exit
Serial Port 6 Configuration			<div>→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save &amp; Exit ESC Exit</div>	
Serial Port Device Settings		[Enabled] IO=2E0h; IRQ=10;		
Change Settings		[Auto]		
Version 2.14.1219. Copyright (C) 2011, American Megatrends, Inc.				

**Serial Port**

Options: Disabled, Enabled

**Change Settings**

Options: Auto,

IO=2F0h; IRQ=7;

IO=3F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12;

IO=2E8h; IRQ=3, 4, 5, 6, 7, 10, 11, 12

IO=2F0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12

IO=2E0h; IRQ=3, 4, 5, 6, 7, 10, 11, 12

Table 56 Advanced Menu –H/W Monitor

BIOS SETUP UTILITY				
Main	Advanced	Boot	Security	Save & Exit
PC Health Status				→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save & Exit ESC Exit
CPU Warning Temperature		[Enabled]		
>Smart FAN Function				
CPU Temperature		: +63 C		
SYS Temperature		: +50 C		
Fan Speed		: N/A		
+VCORE		: +1.216 V		
+VGFX		: +1.072 V		
+3.3V		: +3.360 V		
+5V		: +5.016 V		
+VIN		: +12.032 V		
+1.05V		: +1.072V		
+1.5V		: +1.508 V		
+VSBVCC		: +4.963 V		
Version 2.14.1219. Copyright (C) 2011, American Megatrends, Inc.				

**CPU Warning Temperature**

Options: Disabled, 80 °C , 85 °C, 90 °C

**Smart FAN Function**■ **Smart Fan 1 Mode**

Options: Full on Mode, Automatic Mode, Manual Mode

## ■ Boot Menu

Table 57 Boot Menu

BIOS SETUP UTILITY				
Main	Advanced	Boot	Security	Save & Exit
Boot Configuration			→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save & Exit ESC Exit	
Full Screen LOGO Display		[Disabled]		
Setup Prompt Timeout		1		
Bootup NumLock State		[On]		
Boot Option Priorities				
Boot Option #1		[UEFI: SanDisk]		
Boot Option#2		[SATA PM: TOSHIBA...]		
Hard Drive BBS Priorities				
Version 2.14.1219. Copyright (C) 2011, American Megatrends, Inc.				

### Full Screen LOGO Display

Options: Disabled, Enabled

### Bootup Numlock State

Options: On, Off

### Boot Option #1

Options: UEFI: SanDisk , SATA PM: TOSHIBA, Disabled

### Boot Option #2

Options: UEFI: SanDisk , SATA PM: TOSHIBA, Disabled

### Hard Drive BBS Priorities

#### ■ Boot Option #1: SATA PM: TOSHIBA

Options: UEFI: SanDisk , SATA PM: TOSHIBA, Disabled

#### ■ Boot Option #2 : SanDisk

Options: UEFI: SanDisk , SATA PM: TOSHIBA, Disabled

## ■ Security Menu

Table 58 Security Menu

BIOS SETUP UTILITY				
Main	Advanced	Boot	Security	Save & Exit
Password Description  If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights The password length must be in the following range: Minimum Length Maximum length  Administrator Password User Password  HDD Security Configuration: HDD 0:			→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save & Exit ESC Exit	
Version 2.14.1219. Copyright (C) 2011, American Megatrends, Inc.				

## ■ Save & Exit Menu

Table 59 Save &amp; Exit Menu

BIOS SETUP UTILITY				
Main	Advanced	Boot	Security	Save & Exit
Save Changes and Reset Discard Changes and Reset  Save Options Save Changes Discard Changes  Restore Defaults			→ ← Select Screen ↑↓ Select Item Enter: Select +- Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4 Save & Exit ESC Exit	
Version 2.14.1219. Copyright (C) 2011, American Megatrends, Inc.				

**Save Changes and Exit**

Exit system setup after saving the changes. Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved to the CMOS RAM. The CMOS RAM is sustained by an onboard backup battery and stays on even when the PC is turned off. When you select this option, a confirmation window appears. Select [Yes] to save changes and exit.

**Discard Changes and Exit**

Exit system setup without saving any changes. Select this option only if you do not want to save the changes that you made to the Setup program. If you made changes to fields other than system date, system time, and password, the BIOS asks for a confirmation before exiting.

**Discard Changes**

Discards changes done so far to any of the setup values. This option allows you to discard the selections you made and restore the previously saved values. After selecting this option, a confirmation appears. Select [Yes] to discard any changes and load the previously saved values.

**Load Optimal Defaults**

Load Optimal Default values for all the setup values. This option allows you to load optimal default values for each of the parameters on the Setup menus, which will provide the best performance settings for your system. The F9 key can be used for this operation.

**Load Failsafe Defaults**

Load Optimal Default values for all the setup values. This option allows you to load failsafe default values for each of the parameters on the Setup menus, which will provide the most stable performance settings. The F8 key can be used for this operation.

## Chapter 5

# Driver Installation

If your KEEEX-1650 does not come with an operating system pre-installed, you will need to install an operating system and the necessary drivers to operate it. After you have finished assembling your system and connected the appropriate power source, power it up using the power supply and install the desired operating system. You can download the drivers for the KEEEX-1650 from the Quanmax website at [www.quanmax.com](http://www.quanmax.com) and install as instructed there. For other operating systems, please contact Quanmax.

---

### NOTE



When the system reboots without connecting the CRT, there might be no image on screen when you insert the CRT/VGA cable. Please pressing **<Ctrl>+<Alt>+<F1>** simultaneously to show the image on screen.

---

## Appendix A

# DIO (Digital I/O) Sample Code

```

//*****//
//DIO sample code for KEEX-1650                                     //
//Please compile with Turbo C 3.0 to utilized the program           //
//                                                                    //
//DIO GPIO pin define from SIO IT8783E                               //
// DIO_0 : GP60      DIO_4 : GP64                                     //
// DIO_1 : GP61      DIO_5 : GP65                                     //
// DIO_2 : GP62      DIO_6 : GP66                                     //
// DIO_3 : GP63      DIO_7 : GP67                                     //
//                                                                    //
//GPIO BASE : 0xA05                                                //
//Bit0 : DIO_0 value  0:Low  1:High                                 //
//Bit1 : DIO_1 value  0:Low  1:High                                 //
//Bit2 : DIO_2 value  0:Low  1:High                                 //
//Bit3 : DIO_3 value  0:Low  1:High                                 //
//Bit4 : DIO_4 value  0:Low  1:High                                 //
//Bit5 : DIO_5 value  0:Low  1:High                                 //
//Bit6 : DIO_6 value  0:Low  1:High                                 //
//Bit7 : DIO_7 value  0:Low  1:High                                 //
//*****//
#include<stdio.h>

#define INDEX_PORT 0x2E
#define DATA_PORT 0x2F
#define REG_LD 0x07

void Unlock_SIO (void)
{
    outportb(INDEX_PORT, 0x87);
    outportb(INDEX_PORT, 0x01);
    outportb(INDEX_PORT, 0x55);
}

```



```

    outportb(INDEX_PORT, 0x55);
}

void Lock_SIO (void)
{
    outportb(INDEX_PORT, 0x02);
    outportb(DATA_PORT, 0x02);
}

//-----
void Set_SIO_LD( int LD)
{
    Unlock_SIO();
    outportb(INDEX_PORT, REG_LD);
    outportb(DATA_PORT, LD);
    Lock_SIO();
}

//-----
void Set_SIO_Reg( int REG, int DATA)
{
    Unlock_SIO();
    outportb(INDEX_PORT, REG);
    outportb(DATA_PORT, DATA);
    Lock_SIO();
}

//-----
int Get_SIO_Reg(int REG)
{
    int Result;
    Unlock_SIO();
    outportb(INDEX_PORT, REG);
    Result = inportb(DATA_PORT);
    Lock_SIO();

    return Result;
}

int main()

```

```

{
    int      GPIOBASE = 0xA05;
    int      RetVal;
    int      i;
    int      Temp;

//Set DIO_0~7 as Input
//0:input 1:output
    Set_SIO_LD(0x07);
    RetVal = Get_SIO_Reg(0xCD);
    RetVal &= 0x00;
    Set_SIO_Reg(0xCD, RetVal);

//Read DIO_0~7 value
    RetVal = inportb(GPIOBASE);

    printf("Read DIO_0~7 value\n");
    for (i=0; i<8; i++)
    {
        Temp = (RetVal>>i) & 0x01;
        printf("DIO_%d = %d\n",i ,Temp);
    }
    system("pause");

//Set DIO_0~7 as Output
//0:input 1:output
    Set_SIO_LD(0x07);
    RetVal = Get_SIO_Reg(0xCD);
    RetVal |= 0xFF;
    Set_SIO_Reg(0xCD, RetVal);

//set DIO_0~7 to High
    printf("Set DIO_0~7 to High\n");
    outportb(GPIOBASE, 0xFF);
    system("pause");

//set DIO_0~7 to Low
    printf("Set DIO_0~7 to Low\n");

```

```
    outportb(GPIOBASE, 0x00);  
    system("pause");  
return 0;  
}
```

## Appendix B

### WatchDog Timer Sample Code

```
//=====
//KEEX-1650 DOS Watchdog sample program
//Please compile with Turbo C 3.0 to utilized the program
//=====

#include<stdio.h>
int main()
{
    int value;

    //Enter the MB PnP Mode
    outp(0x2E,0x87);
    outp(0x2E,0x01);
    outp(0x2E,0x55);
    outp(0x2E,0x55);

    //Setting Logical Device Number to 0x07
    outp(0x2E,0x07);
    outp(0x2F,0x07);

    //Set Timer unit
    //(0x72 bit7(0: Minute, 1: Secont) of watchdog timer by setting this bit)
    outp(0x2E,0x72);
    value = inp(0x2F) & 0x5F;
    value = value | 0x80;//set unit sec.
    outp(0x2F,value);

    //Set WDT output through KRST
    //(0x72 bit6(1: Enable, 0: Disable))
    outp(0x2E,0x72);
    value = inp(0x2F) & 0xBF;
    value = value | 0x40;//Enable WDT output
    outp(0x2F,value);

    //Set Timer Value
    //(0x73 Time of watchdog timer)
    outp(0x2E,0x73);
    outp(0x2F,0x14);//set to 20 sec (0x14)
```

```
//Exit the MB PnP Mode
    outp(0x2E,0x02);
    outp(0x2F,0x02);

return 0;
}
```